**Programme Specification**

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| **Please note:** This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she passes the programme. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in the programme handbook. The accuracy of the information contained in this specification is reviewed by the University and may be checked by the Quality Assurance Agency for Higher Education. |

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| **BEng (Hons) Biomedical Engineering**  **BEng (Hons) Biomedical Engineering with a Year in Industry** |

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| 1. **Awarding Institution/Body** | University of Kent |
| 1. **Teaching Institution** | University of Kent |
| 1. **School responsible for management of the programme** | Engineering and Digital Arts |
| 1. **Teaching Site** | Canterbury |
| 1. **Mode of Delivery** | Full-time |
| 1. **Programme accredited by** | Accreditation will be applied for from the Engineering Council. |
| 1. **a) Final Award** | BEng (Hons) |
| 7. **b) Alternative Exit Awards** | BEng (non hons) Biomedical Engineering;  Diploma in Biomedical Engineering;  Certificate in Biomedical Engineering |
| 1. **Programme** | Biomedical Engineering |
| 1. **UCAS Code (or other code)** | 3DJ9: BEng (Hons) Biomedical Engineering;  O5C3: BEng (Hons) Biomedical Engineering with a Year in Industry |
| 1. **Credits/ECTS Value** | 360 credits (180 ECTS) |
| 1. **Study Level** | Undergraduate |
| 1. **Relevant QAA subject benchmarking group(s)** | Engineering;  Biomedical Science |
| 1. **Date of creation/revision** | October 2013 (Revised version 2016, Name change 2017), revised FSO Jan 2018/Dec 2018 |
| 1. **Intended Start Date of Delivery of this Programme** | September 2019 |

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| 1. **Educational Aims of the Programme**   The programme aims to: |
| 1. Educate students to become engineers who are well equipped for professional careers in development, research and production in industry and universities, and who are well adapted to meet the challenges of a rapidly changing subject. 2. Produce professional engineers skilled in Biomedical engineering with a well-balanced knowledge of Electronic System Engineering. 3. Provide proper academic guidance and welfare support for all students. 4. Create an atmosphere of co-operation and partnership between staff and students, and offer the students an environment where they can develop their potential.   *The Year in Industry programme additionally aims to:*   1. Give an opportunity to gain experience as an engineer working in a professional environment. 2. To develop employment-related skills, including an understanding of how you relate to the structure and function in an organisation, via a year in industry. |

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| **16 Programme Outcomes**  The programme provides opportunities for students to develop and demonstrate knowledge and understanding, qualities, skills and other attributes.  The programme outcomes have references to the subject benchmarking statement for Engineering (2015) using the Engineering Council and IET AHEP3 learning outcomes.    The programme outcomes also have references to the subject benchmark statements in Biomedical Science (2015)  BSB=Biomedical Subject Benchmark |

**A. Knowledge and Understanding of:**

1. Mathematical principles relevant to bioengineering (SM2p).
2. Scientific principles and methodology relevant to bioengineering (SM1p).
3. Advanced concepts of instrumentation and systems engineering.
4. The value of intellectual property and contractual issues (EP5p).
5. Business and management techniques which may be used to achieve engineering objectives (ET1p, ET2p, ET3p, ET5p).
6. The need for a high level of professional and ethical conduct in engineering (ET1p).
7. Current manufacturing practice with particular emphasis on product safety, environmental and EMC standards and directives (ET6p,D2p).
8. Characteristics of materials, equipment, processes and products (EP2p).
9. Appropriate codes of practice, industry standards and quality issues (EP6p, EP7p, ET6p).
10. Contexts in which engineering knowledge can be applied (EP1p).
11. The structure, function and control of the human body. (BSB 8.6i)
12. The main metabolic pathways used in biological systems in catabolism and anabolism, understanding biological reactions in chemical terms. (BSB 8.6i)
13. The variety of mechanisms by which metabolic pathways can be controlled and the way that they can be co-ordinated with changes in the physiological environment. (BSB 8.6i)
14. The main principles of cell and molecular biology, biochemistry and microbiology. (BSB 8.6i)
15. Immunological disease/disorders. (BSB 8.6i)
16. The main methods for communicating information on biomedical sciences (BSB 8.6iv, BSB 8.6ix)

*Outcomes specific to Year in Industry programme:*

1. Aspects of the core subject areas from the perspective of a commercial or industrial organisation.

**Skills and Other Attributes**

**B. Intellectual Skills:**

1. Analysis and solution of problems in bioengineering using appropriate mathematical methods. (SM2p)
2. Ability to apply and integrate knowledge and understanding of other engineering and bioscience disciplines to support study of bioengineering (SM3p), (BSB 8.8ii).
3. Use of engineering and bioscience principles and the ability to apply them to analyse key bioengineering processes (EA1p), (BSB 8.6i)
4. Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques (EA2p).
5. Ability to apply and understand a systems approach to bioengineering problems (EA4p).
6. Ability to investigate and define a problem and identify constraints including cost drivers, economic, environmental, health and safety and risk assessment issues (ET6p,D2p,EP9p).
7. Ability to use creativity to establish innovative, aesthetic solutions whilst understanding customer and user needs, ensuring fitness for purpose of all aspects of the problem including production, operation, maintenance and disposal (D1p,D2p,D4p,D5p).
8. Ability to demonstrate the economic and environmental context of the engineering solution (ET1p,ET3p,ET4p).
9. Integrate scientific evidence, to formulate and test hypotheses. (BSB 8.6iii,8.6iv,8.8i)
10. Recognise the moral and ethical issues of biomedical investigations and appreciate the need for ethical standards and professional codes of conduct. (BSB 8.6v)

*Outcomes specific to Year in Industry programme:*

1. Apply some of the intellectual skills specified for the programme from the perspective of a commercial or industrial organisation.

**C. Subject-specific Skills (Engineering):**

1. Use of mathematical techniques to analyse problems in bioengineering. (SM2p)
2. Ability to work in an engineering laboratory environment and to use a wide range of electronic equipment, workshop equipment and CAD tools for the practical realisation of electronic circuits (EP1p, EP3p).
3. Ability to work with technical uncertainty or incomplete knowledge (EP8p, D3p).
4. Ability to apply quantitative methods and computer software relevant to engineering in order to solve bioengineering problems (EA3p).
5. Ability to design electronic circuits or systems to fulfil a product specification and devise tests to appraise performance. (D5p, EP9p)
6. Awareness of the nature of intellectual property and contractual issues and an understanding of appropriate codes of practice and industry standards (EP5p, D2p, EP7p, ET2p, ET5p).
7. Ability to use technical literature and other information sources and apply it to a design (EP4p).
8. Ability to apply management techniques to the planning, resource allocation and execution of a design project and evaluate outcomes (D5p).
9. Ability to prepare technical reports and give presentations to technical and non-technical audiences. (D6p)

*Outcomes specific to Year in Industry programme:*

1. Apply some of the subject-specific skills specified for the programme from the perspective of a commercial or industrial organisation.

**Subject-specific Skills (Biomedical science):**

1. To be able to handle, biological material in general and chemicals in a safe way, thus being able to assess any potential hazards associated with biomedical experimentation. (BSB 8.8iii)
2. Perform risk assessments prior to the execution of an experimental protocol.
3. To be able to use basic and advanced experimental equipment in executing the core practical techniques used by biomedical scientists. (BSB 8.8iii)
4. To find information on biomedical topics from a wide range of information resources (e.g. journals, books, electronic databases) and maintain an effective information retrieval strategy. (BSB 8.6iv, 8.6vii,8.6ix)
5. To be able to plan, execute and assess the results from experiments using acquired subject-specific knowledge. (BSB 8.6ii, 8.6vi, 8.8iii)
6. To identify the best method for presenting and reporting on biomedical investigations using written, data manipulation/presentation and computer skills. (BSB 8.6iii, 8.6iv)
7. Be aware of the employment opportunities for bioengineering graduates.

**D. Transferable Skills:**

1. Ability to generate, analyse, present and interpret data. (BSB 8.6iii, 8.6iv,8.6vi)
2. Use of Information and Communications Technology. (BSB 8.6ii, 8.6iii)
3. Personal and interpersonal skills, work as a member of a team. (BSB 8.6iii, 8.6v)
4. Communicate effectively (in writing, verbally and through drawings). (BSB 8.6i, 8.6iv, 8.6vii)
5. Learn effectively for the purpose of continuing professional development. (BSB 8.6i, 8.6iv, 8.6vii)
6. Ability for critical thinking, reasoning and reflection. (BSB 8.6iii)
7. Ability to manage time and resources within an individual project and a group project. (BSB 8.6iii, 8.6v)

**Teaching/learning and assessment methods and strategies used to enable the programme learning outcomes to be achieved and demonstrated**

**Teaching/learning**

Lectures; tutorial lectures; demonstrator-led examples classes; tutor led small group supervisions; project work; laboratory experiments and computer-based assignments. Case studies on industry hot-topics and emerging technologies and issues relating to bioengineering and ethical standards. In particular the 1st, 2nd and 3rd year projects give hands-on experience of electronic design and project management.

Problem solving workshops allow you to develop skills in applying biomedical knowledge to solution of problems. Practical classes teach specific laboratory skills and demonstrate how they can be used to investigate biomedical systems.

**Assessment**

Written unseen examinations; assessed coursework in the form of examples class assignments, laboratory write-ups, assessed project work, and computer-based assignments and essays and class tests. Skill D5 is not formally assessed***.***

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| For more information on the skills developed by individual modules and on the specific learning outcomes associated with any Certificate, Diploma or BA/BSc non-honours awards relating to this programme of study, see the module mapping table, located at the end of this specification. |
| **17 Programme Structures and Requirements, Levels, Modules, Credits and Awards**  This programme is studied over three years full-time with an additional industrial placement year for the Year in Industry variant.  The programme is divided into three stages and four stages for the Year in Industry variant, each stage comprising modules to a total of 120 credits. Students must successfully complete each module in order to be awarded the specified number of credits for that module. One credit corresponds to approximately ten hours of 'learning time' (including all classes and all private study and research). Thus obtaining 120 credits in an academic year requires 1,200 hours of overall learning time. For further information on modules and credits refer to the Credit Framework at <http://www.kent.ac.uk/teaching/qa/credit-framework/creditinfo.html>  Each module and programme is designed to be at a specific level. For the descriptors of each of these levels, refer to Annex 2 of the Credit Framework at <http://www.kent.ac.uk/teaching/qa/credit-framework/creditinfoannex2.html>.  To be eligible for the award of an honours degree students on the three year programme must normally have to obtain 360 credits, at least 210 of which must be Level 5 or above, and at least 90 of which must be level 6 or above at Stage 3. To be eligible for the award of an honours degree on the Year in Industry variant, students normally have to obtain 480 credits, at least 330 of which must be Level 5 or above, and at least 90 of which must be level 6 or above at Stage 3. A degree without honours will be awarded where students achieve 300 credits with at least 150 credits at level 5 or above including at least 60 credits at level 6 or above at Stage 3. Students may not progress to the non-honours degree programme; the non-honours degree programme will be awarded as an alternative exit award only.  **Alternative Exit Awards:**  Students successfully completing Stage 1 of the programme and meeting credit framework requirements who do not successfully complete Stage 2 will be eligible for the award of the Certificate in Biomedical Engineering.  Students successfully completing Stage 1 and Stage 2 of the programme and meeting Credit Framework requirements who do not successfully complete Stage 3 will be eligible for the award of the Diploma in Biomedical Engineering.  Students successfully completing Stage 2 of the programme and achieving 300 credits overall including at least 60 credits at level 6 or above in Stage 3 and meeting Credit Framework requirements will be eligible for the award of a non-honours degree.  Students successfully completing Stage 2 and also the placement and meeting credit framework requirements will be eligible for the award of the Diploma with a Year in Industry.  For further information refer to the Credit Framework at <https://www.kent.ac.uk/teaching/qa/credit-framework/creditinfo.html#exit-awards>.  For the purposes of Honours classification, the weightings of the stages are:   |  |  |  | | --- | --- | --- | | Three stage programme: | Stage 2 | 30% | |  | Stage 3 | 70% | |  |  |  | | Year in Industry programme: | Stage 2 | 25% | |  | Industrial Placement | 10% | |  | Stage 3 | 65% |   Compulsory modules are core to the programme and must be taken by all students studying the programme. Optional modules provide a choice of subject areas, from which students will select a stated number of modules. The normal expectation is that the termly module load will be equally balanced across the terms.  Where a student fails a module(s), but has marks for such modules within 10 percentage points of the pass mark, the Board of Examiners may nevertheless award the credits for the module(s), subject to the requirements of the Credit Framework and provided that the student has achieved the **programme** learning outcomes. For further information refer to the Credit Framework at <http://www.kent.ac.uk/teaching/qa/credit-framework/creditinfo.html>.  Compensation of modules is limited to 15 credits per stage in line with IET accreditation requirements, except for Stage 1 where 30 credits can be compensated. Failure in certain modules, however, may not be compensated, as indicated by the symbol \* below. Usually, no modules at any stage of the programme can be trailed or condoned.  Modules marked with a + require the coursework mark and the examination mark to be greater than or equal to 30% as well as achieving the module pass mark in order to obtain credit. In addition these modules will only be considered for compensation if the coursework mark and the examination mark are each greater than 30%.  Students completing Stage 1 with an overall mark of 55% can transfer to/remain on the Year in Industry programme. |

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| **KV Code** | **Code** | **Title** | **Level** | **Credits** | **Term(s)** |
| **Stage 1** | | | | | |
| **Compulsory Modules** | | | | | |
| BIOS3000 | BI300 | Introduction to Biochemistry | 4 | 15 | 1 |
| BIOS3020 | BI302 | Molecular & Cellular Biology | 4 | 15 | 1 & 2 |
| BIOS3080 | BI308 | Skills for Bioscientists | 4 | 15 | 1 & 2 |
| EENG3050 | EL305 | Introduction to Electronics | 4 | 15 | 1 |
| EENG3110 | EL311 | First year Engineering applications project | 4 | 15 | 2 |
| EENG3150 | EL315 | Digital Technologies | 4 | 15 | 2 |
| EENG3180 | EL318 | Engineering Mathematics | 4 | 15 | 1 |
| EENG3190 | EL319 | Engineering Analysis | 4 | 15 | 2 |
| **Stage 2** | | | | | |
| **Compulsory Modules** | | | | | |
| BIOS3070 | BI307 | Human Physiology & Disease | 4 | 15 | 2 |
| BIOS5320 | BI532 | Skills for Bioscientists II | 5 | 15 | 1 |
| EENG3130 | EL313 | Introduction to Programming | 4 | 15 | 1 |
| EENG6140 | EL514 | Biomechanics | 5 | 15 | 2 |
| EENG5150 | EL515 | Physiological Measurements | 5 | 15 | 1 & 2 |
| EENG5610 | EL561+ | Image Analysis and Applications | 5 | 15 | 2 |
| EENG5620 | EL562 | Computer Interfacing Group Project | 5 | 15 | 1 & 2 |
| EENG5690 | EL569+ | Signals and Systems | 5 | 15 | 1 & 2 |
| **Stage S - Industrial Placement Year** | | | | | |
| **Compulsory Module** | | | | | |
| EENG7910 | EL791\* | Year in Industry (Industrial Assessment) | 5 | 90 | 1 & 2 |
| EENG7920 | EL792\* | Year in Industry (Academic Assessment) | 5 | 30 | 1 & 2 |
| **Stage 3** | | | | | |
| **Compulsory Modules** | | | | | |
| BIOS5130 | BI513 | Human Physiology and Disease II | 5 | 15 | 1 |
| EENG6000 | EL600\* | Project | 6 | 45 | 1 & 2 |
| EENG6141 | EL614 | Biomaterials | 6 | 15 | 1 & 2 |
| EENG6710 | EL671 | Product Development | 6 | 15 | 1 & 2 |
| EENG6760 | EL676+ | Digital Signal Processing and Control | 6 | 15 | 1 & 2 |
| **Optional Modules**  Students must select *one module* from the following: | | | | | |
| BIOS6380 | BI638 | Bioinformatics and Genomics | 6 | 15 | 1 |
| BIOS6400 | BI642 | Cancer Biology | 6 | 15 | 1 |
| PHYS5130 | PH513 | Medical Physics | 5 | 15 | 2 |

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| **18 Work-Based Learning** |
| Disability Statement: Where disabled students are due to undertake a work placement as part of this programme of study, a representative of the University will meet with the work placement provider in advance to ensure the provision of anticipatory and reasonable adjustments in line with legal requirements. |
| Students on the Year in Industry programme take two modules in their third year, and spend a year (minimum 30 weeks) working in an industrial or commercial setting, applying and enhancing the skills and techniques they have developed and studied in Stages 1 and 2 of their programme. The work they do is entirely under the direction of their industrial supervisor, but support is provided via an Employability Officer and Placement Tutor within the School. This support includes ensuring that the work they are being expected to do is such that they can meet the learning outcomes of the module.  The onus is on the student to secure the placement, however support and guidance is provided by the EDA Employability Officer  Assessment of the placement has two components:   * Assessment by the Placement Tutor, Employability Officer and Industrial Supervisor, covering the student's management capability and decision-making skills, the resourcefulness and creativity they have evidenced, their functional/technical skills and knowledge, written and oral communication skills, ability to work in a team and general reliability. This assessment is guided by the Employability Officer and moderated internally by the School. * Assessment of a reflective written report produced by the student. This report is required to include:   + A description of the organisation in which the placement took place, and the student's role(s) within it.   + A description of the various tasks undertaken during the placement.   + The training, both formal (courses) and informal (on the job), undertaken by student in the period plus any other learning experiences.   + Any changes to the supervision or nature of the placement.   + A discussion about the outcomes of the work, or other influential impacts on the placement.   + Reflection on significant achievements and personal developments through the year.   The Employability Officer makes the first visit to students who are on placement with companies where we have a long-standing industrial placement relationship. This takes place near the start of the placement to check that integration into the workplace is proceeding and that the work being required of the student is appropriate. The Placement Tutor makes the first visit to companies that we do not have an established collaboration with. The second placement visit is undertaken by the Placement Tutor towards the end of the placement to assess both the student’s performance and the organisation in order to ensure that both satisfy the requirements of the assessment process.  For further information, please refer to the year in industry module specifications. |

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| **19 Support for Students and their Learning** |
| * School and University induction programme * Programme/module handbooks * Library services <http://www.kent.ac.uk/library/> * Student Support <http://www.kent.ac.uk/studentsupport/> * Student Wellbeing [www.kent.ac.uk/studentwellbeing/](http://www.kent.ac.uk/studentwellbeing/) * Centre for English and World Languages <http://www.kent.ac.uk/cewl/index.html> * Student Learning Advisory Service <http://www.kent.ac.uk/uelt/about/slas.html> * PASS system <https://www.kent.ac.uk/teaching/qa/codes/taught/annexg.html> * Academic Adviser system <https://www.kent.ac.uk/teaching/advisers/index.html> * Kent Union [www.kentunion.co.uk/](http://www.kentunion.co.uk/) * Careers and Employability Services [www.kent.ac.uk/ces/](http://www.kent.ac.uk/ces/) * Counselling Service <https://www.kent.ac.uk/studentwellbeing/counselling/> * Information Services (computing and library services) [www.kent.ac.uk/is/](http://www.kent.ac.uk/is/) * Undergraduate student representation at School, Faculty and Institutional levels * International Recruitment Office <https://www.kent.ac.uk/internationalstudent/>; International Partnerships Office <https://www.kent.ac.uk/global/partnerships/> * Medical Centre <https://www.kent.ac.uk/studentwellbeing/medicalcentre.html>   School-specific support available:   * Moodle VLE pages with full module information, assignments, lecture notes, coursework submission etc. * SEDA web pages with comprehensive information regarding all aspects of studies at Kent. Also various newsgroups * Health and Safety booklet provided at the start of each academic year * Computing and multimedia facilities, lecture and seminar rooms and experimental laboratories all within the Jennison building and on the campus. Many of these rooms contain audio-visual equipment and computer projectors. * Welfare guidance: The School has a Student Support Officer providing guidance and support on welfare issues. * Support for Students on Placement   Support for the placement year commences early in Stage 2 with a briefing from the academic supervisor as to what students should expect during their placement year including the application process, the University support provided during the placement year and the range of work students are likely to undertake. Students are then supplied with details of placement opportunities as they become available. Students applying are given assistance and advice on the preparation of their CV, their application letters, and interview techniques.  Prospective employers attend a Student Placement briefing session so that they understand what to expect and what is required in terms of safety, induction and supervision. They also have the opportunity to meet the academic and administrative support staff who will be involved.  When students start their placement year they are given a Placement Year Handbook which includes:   * + Induction Checklist   + Contact details form   + Health and Safety Checklist (which must be signed by the employer)   + Final Report guidelines   + Year in Industry Performance Evaluation form (completed by student and employer) |

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| **20 Entry Profile**  The minimum age to study a degree programme at the university is normally at least 17 years old by 20 September in the year the programme begins. There is no upper age limit. |
| 20.1 **Entry Route**  For current information, please refer to the University prospectus |
| * A level – ABB including Mathematics and Biology or Chemistry grade B, plus Electronics/ Physics/ Computing AS or A level grade B. * International Baccalaureate – 34 points overall or 16 points at HL, including Mathematics (not Mathematics Studies) 5 at HL or 6 at SL, and Biology 5 at HL or 6 at SL |
| 20.2 **What does this programme have to offer?** |
| * An excellent grounding in the underlying and combined principles of bio-science, bio-mechanics, bio-materials and electronic circuit design and electronics systems. * The opportunity to study subjects related to electronic systems and biosciences such as physiology, physiological measurement and image analysis. * The development of a broad range of skills that are highly sought after by employers and which open up a wide range of careers to graduates within the engineering, bio- and medical science industries. |
| 20.3 **Personal Profile** |
| * An interest in medical science, biology, chemistry and electronic systems. * A desire to become an engineer working in the bio-engineering industry. * A willingness to work with computers and develop computational models. * A desire to develop design and programming skills. * A commitment to develop the skills that are required to build electronic systems. |

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| 21 **Methods for Evaluating and Enhancing the Quality and Standards of Teaching and Learning** |
| 21.1 **Mechanisms for review and evaluation of teaching, learning, assessment, the curriculum and outcome standards** |
| * Student module evaluations * Annual programme and module monitoring reports <http://www.kent.ac.uk/teaching/qa/codes/taught/annexe.html> * External Examiners system <http://www.kent.ac.uk/teaching/qa/codes/taught/annexk.html> * Periodic programme review <http://www.kent.ac.uk/teaching/qa/codes/taught/annexf.html> * Annual staff appraisal * Peer observation * Quality Assurance Framework <http://www.kent.ac.uk/teaching/qa/codes/index.html> |
| 21.2 **Committees with responsibility for monitoring and evaluating quality and standards** |
| * Staff-Student Liaison Committee * School Education Committee * Faculty Education Committee * Faculty Board * Education Board * Board of Examiners |
| 21.3 **Mechanisms for gaining student feedback on the quality of teaching and their learning experience** |
| * Student module evaluations * Staff-Student Liaison Committee * Student rep system (School, Faculty and Institutional level) * Annual NSS |
| 21.4 **Staff Development priorities include:** |
| * PGCHE requirements * HEA (associate) fellowship membership * Annual appraisals * Institutional Level Staff Development Programme * Academic Practice Provision (PGCHE, other development opportunities) * Professional body membership and requirements * Programme team meetings * Research seminars * Conferences * Study leave * Equality, Diversity and Inclusivity (EDI) awareness |

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| 22 **Indicators of Quality and Standards** |
| * Results of periodic programme review (2014) * QAA Higher Education Review 2015 * Annual External Examiner reports * Annual programme and module monitoring reports |
| 22.1 **The following reference points were used in creating these specifications:** |
| * QAA Benchmarking statements for Engineering (2015) and Biomedical Science (2015). * Accreditation requirements of the Engineering Council * School and Faculty plan * University Plan <https://www.kent.ac.uk/about/plan/> and Learning and Teaching Strategies <https://www.kent.ac.uk/uelt/strategies/lta.html> * Staff research activities * Kent Inclusive Practices (<https://www.kent.ac.uk/studentsupport/accessibility/inclusive-practice.html>) |

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| 23 **Inclusive Programme Design** |
| The School recognises and has embedded the expectations of current equality legislation, by ensuring that the programme is as accessible as possible by design. Additional alternative arrangements for students with Inclusive Learning Plans (ILPs)/declared disabilities will be made on an individual basis, in consultation with the relevant policies and support services. |

*Template last updated November 2017*

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|  |  | **Codes** | **A1** | **A2** | **A3** | **A4** | **A5** | **A6** | **A7** | **A8** | **A9** | **A10** | **A11** | **A12** | **A13** | **A14** | **A15** | **A16** | **A17** |
| **STAGE 1** | **Introduction to biochemistry** | **BI300** |  |  |  |  |  |  |  |  |  |  | **x** | **x** |  | **x** |  | **x** |  |
| **Introduction to Electronics** | **EL305** |  | **x** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Digital Technologies** | **EL315** |  | **x** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Engineering Mathematics** | **EL318** | **x** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Project** | **EL311** |  |  |  |  |  |  | **x** | **x** |  | **x** |  |  |  |  |  |  |  |
| **Molecular and cellular Biology** | **BI302** |  |  |  |  |  |  |  |  |  |  |  |  | **x** | **x** |  | **x** |  |
| **Skills for Bio scientists** | **BI308** |  |  |  |  |  |  |  |  |  |  | **x** |  |  | **x** |  | **x** |  |
| **Engineering Analysis** | **EL319** | **x** | **x** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **STAGE 2** | **Introduction to Programming** | **EL313** |  | **x** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Skills for bioscientists II** | **BI532** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **x** |  |
| **Computer Interfacing** | **EL562** |  |  |  |  | **x** | **x** |  | **x** | **x** | **x** |  |  |  |  |  |  |  |
| **Signals and Systems** | **EL569** | **x** | **x** | **x** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Human Physiology and disease** | **BI307** |  |  |  |  |  |  |  |  |  |  | **x** | **x** |  | **x** | **x** |  |  |
| **Biomechanics** | **EL514** | **x** | **x** | **x** |  |  |  |  |  |  |  | **x** |  |  |  |  |  |  |
| **Images Analysis** | **El561** | **x** | **x** | **x** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Physiological measurements** | **EL515** |  | **x** | **x** |  |  |  |  | **x** |  |  |  |  |  |  |  |  |  |
| **Year in Industry (IA)** | **EL791** |  |  |  |  |  |  |  |  |  | **x** |  |  |  |  | **x** |  | **x** |
|  | **Year in Industry (AA)** | **EL792** |  |  |  |  |  |  |  |  |  | **x** |  |  |  |  | **x** |  | **x** |
| **STAGE 3** | **Project** | **EL600** |  |  |  | **x** | **x** | **x** | **x** | **x** | **x** | **x** |  |  |  |  |  |  |  |
| **Biomaterials** | **EL614** | **x** | **x** |  |  |  |  |  | **x** |  |  | **x** |  |  |  |  |  |  |
| **Physiology** | **BI513** |  |  |  |  |  |  |  |  |  |  | **x** |  |  |  |  | **x** |  |
| **Product Development** | **EL671** |  |  |  |  | **x** | **x** | **x** | **x** | **x** | **x** |  |  |  |  |  |  |  |
| **D.S.P. and Control** | **EL676** | **x** | **x** | **x** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **1 of 3 options** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Bioinformatics and Genomics** | **BI638** |  |  |  |  |  |  |  |  |  |  | **x** | **x** | **x** | **x** |  |  |  |
| **Cancer Biology** | **BI642** |  |  |  |  |  |  |  |  |  |  | **x** | **x** |  | **x** | **x** |  |  |
| **Medical Physics** | **PH513** |  | **x** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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|  |  | **Codes** | **B1** | **B2** | **B3** | **B4** | **B5** | **B6** | **B7** | **B8** | **B9** | **B10** | **B11** |
| **STAGE 1** | **Introduction to biochemistry** | **BI300** | **x** |  | **x** |  |  |  |  |  |  |  |  |
| **Introduction to Electronics** | **EL305** | **x** |  | **x** | **x** |  |  |  |  |  |  |  |
| **Digital Technologies** | **EL315** | **x** |  | **x** | **x** |  |  |  |  |  |  |  |
| **Engineering Mathematics** | **EL318** | **x** |  |  | **x** |  |  |  |  |  |  |  |
| **Project** | **EL311** |  | **x** |  | **x** |  | **x** |  |  |  |  |  |
| **Molecular and cellular Biology** | **BI302** |  |  | **x** |  |  |  |  |  |  |  |  |
| **Skills for Bio scientists** | **BI308** | **x** |  | **x** |  |  |  |  |  |  | **x** |  |
| **Engineering Analysis** | **EL319** | **x** |  | **x** | **x** |  |  |  |  |  |  |  |
| **STAGE 2** | **Introduction to Programming** | **EL313** |  |  | **x** |  |  |  |  |  |  |  |  |
| **Skills for bioscientists II** | **BI532** | **x** | **x** | **x** |  |  |  |  |  | **x** | **x** |  |
| **Computer Interfacing** | **EL562** |  | **x** | **x** | **x** | **x** | **x** | **x** | **x** |  |  |  |
| **Signals and Systems** | **EL569** | **x** |  | **x** | **x** | **x** |  |  |  |  |  |  |
| **Human Physiology and disease** | **BI307** |  |  | **x** |  |  |  |  |  |  |  |  |
| **Biomechanics** | **EL514** | **x** | **x** | **x** | **x** | **x** |  |  |  |  |  |  |
| **Images Analysis** | **El561** | **x** |  | **x** | **x** |  |  |  |  |  |  |  |
| **Physiological measurements** | **EL515** | **x** |  | **x** | **x** |  |  |  |  |  |  |  |
| **Year in Industry (IA)** | **EL791** |  | **x** | **x** |  |  | **x** | **x** | **x** |  |  | **x** |
|  | **Year in Industry (AA)** | **EL792** |  | **x** | **x** |  |  | **x** | **x** | **x** |  |  | **x** |
| **STAGE 3** | **Project** | **EL600** |  | **x** | **x** | **x** | **x** | **x** | **x** | **x** |  |  |  |
| **Biomaterials** | **EL614** | **x** | **x** | **x** |  | **x** | **x** |  |  |  |  |  |
| **Human Physiology and disease II** | **BI513** |  |  | **x** |  |  |  |  |  |  |  |  |
| **Product Development** | **EL671** | **x** | **x** | **x** |  |  | **x** | **x** | **x** |  |  |  |
| **D.S.P and Control** | **EL676** | **x** |  | **x** | **x** | **x** |  |  |  |  |  |  |
| **1 of 3 options** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Bioinformatics and Genomics** | **BI638** |  |  | **x** | **x** |  |  |  |  | **x** |  |  |
| **Cancer Biology** | **BI642** | **x** |  | **x** |  |  |  |  |  | **x** |  |  |
| **Medical Physics** | **PH513** | **x** |  | **x** |  |  |  |  |  |  |  |  |

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|  |  | **Codes** | CE1 | CE2 | CE3 | CE4 | CE5 | CE6 | CE7 | CE8 | CE9 | CE10 | CB1 | CB2 | CB3 | CB4 | CB5 | CB6 | CB7 |
| **STAGE 1** | **Introduction to biochemistry** | **BI300** |  |  |  |  |  |  |  |  |  |  | **x** | **x** | **x** | **x** | **x** | **x** |  |
| **Introduction to Electronics** | **EL305** | **x** | **x** |  | **x** | **x** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Digital Technologies** | **EL315** | **x** | **x** |  | **x** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Engineering Mathematics** | **EL318** | **x** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Project Skills** | **EL311** |  | **x** | **x** | **x** | **x** |  | **x** | **x** |  |  |  |  |  |  |  |  |  |
| **Molecular and cellular Biology** | **BI302** |  |  |  |  |  |  |  |  |  |  | **x** | **x** | **x** | **x** | **x** | **x** |  |
| **Skills for Bio scientists** | **BI308** |  |  |  |  |  |  |  |  |  |  | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| **Engineering Analysis** | **EL319** | **x** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **STAGE 2** | **Introduction to Programming** | **EL313** |  |  |  | **x** |  |  |  | **x** |  |  |  |  |  |  |  |  |  |
| **Skills for bioscientists II** | **BI532** |  |  |  |  |  |  |  |  |  |  | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| **Computer Interfacing** | **EL562** |  | **x** | **x** |  | **x** | **x** | **x** |  | **x** |  |  |  |  |  |  |  |  |
| **Signals and Systems** | **EL569** | **x** | **x** |  | **x** | **x** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Human Physiology and disease** | **BI307** |  |  |  |  |  |  |  |  |  |  |  |  |  | **x** |  |  |  |
| **Biomechanics** | **EL514** | **x** |  |  | **x** |  |  | **x** |  | **x** |  |  |  |  |  |  |  |  |
| **Images Analysis** | **EL561** | **x** | **x** |  | **x** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Physiological measurements** | **EL515** | **x** | **x** |  |  |  | **x** |  | **x** |  |  |  |  |  |  |  |  |  |
| **Year in Industry (IA)** | **EL791** |  |  |  |  | **x** |  | **x** |  |  | **x** |  |  |  | **x** | **x** | **x** | **x** |
|  | **Year in Industry (AA)** | **EL792** |  |  |  |  | **x** |  | **x** |  |  | **x** |  |  |  | **x** | **x** | **x** | **x** |
| **STAGE 3** | **Project** | **EL600** |  | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |  |  |  |  |  |  |  |  |
| **Biomaterials** | **EL614** |  |  |  |  |  |  | **x** | **x** |  |  | **x** | **x** | **x** | **x** | **x** |  |  |
| **Human Physiology and disease II** | **BI513** |  |  |  |  |  |  |  |  |  |  | **x** | **x** | **x** | **x** | **x** | **x** |  |
| **Product Development** | **EL671** | **x** |  | **x** |  |  | **x** | **x** |  |  |  |  |  |  |  |  |  |  |
| **D.S.P. and Control** | **EL676** | **x** | **x** |  | **x** | **x** |  |  |  |  |  |  |  |  |  |  |  |  |
| **1 of 3 options** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Bioinformatics and Genomics** | **BI638** |  |  |  |  |  |  |  |  |  |  |  |  |  | **x** |  | **x** |  |
| **Cancer Biology** | **BI642** |  | x |  |  |  |  |  |  |  |  |  |  | **x** |  |  |  |  |
| **Medical Physics** | **PH513** |  |  |  |  |  |  |  |  |  |  |  |  |  | **x** |  |  |  |

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|  |  | **Codes** | D1 | D2 | D3 | D4 | D5-D7[[1]](#footnote-1) |
| **STAGE 1** | **Introduction to biochemistry** | **BI300** | **x** | **x** | **x** | **x** |  |
| **Introduction to Electronics** | **EL305** | **x** |  | **x** | **x** |  |
| **Digital Technologies** | **EL315** | **x** |  |  |  |  |
| **Engineering Mathematics** | **EL318** | **x** |  |  |  |  |
| **Project** | **EL311** | **x** | **x** |  | **x** |  |
| **Molecular and cellular Biology** | **BI302** | **x** | **x** | **x** | **x** |  |
| **Skills for Bio scientists** | **BI308** | **x** | **x** | **x** | **x** |  |
| **Engineering Analysis** | **EL319** | **x** |  |  |  |  |
| **STAGE 2** | **Introduction to Programming** | **EL313** |  | **x** |  |  |  |
| **Skills for bioscientists II** | **BI532** | **x** | **x** | **x** | **x** |  |
| **Computer Interfacing** | **EL562** | **x** | **x** | **x** | **x** |  |
| **Signals and Systems** | **EL569** | **x** |  |  |  |  |
| **Human Physiology and disease** | **BI307** | **x** | **x** | **x** | **x** |  |
| **Biomechanics** | **EL514** | **x** |  | **x** | **x** |  |
| **Images Analysis** | **El561** | **x** |  |  |  |  |
| **Physiological measurements** | **EL515** | **x** |  |  | **x** |  |
| **Year in Industry (IA)** | **EL791** | **x** | **x** | **x** | **x** |  |
|  | **Year in Industry (AA)** | **EL792** | **x** | **x** | **x** | **x** |  |
| **STAGE 3** | **Project** | **EL600** | **x** | **x** | **x** | **x** |  |
| **Biomaterials** | **EL614** | **x** |  | **x** | **x** |  |
| **Human Physiology and disease II** | **BI513** | **x** | **x** |  | **x** |  |
| **Product Development** | **EL671** |  |  |  | **x** |  |
| **D.S.P. and Control** | **EL676** | **X** |  |  |  |  |
| **1 of 3 options** |  |  |  |  |  |  |
| **Bioinformatics and Genomics** | **BI638** | **x** | **x** |  | **x** |  |
| **Cancer Biology** | **BI642** | **x** | **x** | **x** |  |  |
| **Medical Physics** | **PH513** | **x** |  |  |  |  |

1. Shading represents skills D5-D7 that pervade all modules [↑](#footnote-ref-1)